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10/602,529	06/23/2003	Joseph Harold Steinmetz	35022.001C1	8158

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EXAMINER

NGUYEN, TANH Q

ART UNIT	PAPER NUMBER
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2182

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07/06/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/602,529

Applicant(s)

STEINMETZ ET AL.

Examiner

Tanh Q. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-8 is/are allowed.
- 6) ☒ Claim(s) 9-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

2. Claims 10-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 10 recites "wherein each of the two communications-medium port includes a first-in first-out buffer into which commands and data received by the communications-medium port are written, and from which commands and data received by the communications-medium port are accessed by the routing logic". It is not clear whether "the communications-medium port" refers to the first communications-medium port, the second communications-medium port, each of the first and second communications-medium ports, or a communications-medium port corresponding to the FIFO buffer.

Claim 11 recites "the first-in-first-out buffer" in line 2, "the communications-medium port" in line 3, and "the first-in-first-out buffer in line 4". It is not clear whether "the communications-medium port" refers to the first communications-medium port, the second communications-medium port, each of the first and second communications-medium port, or a communications-medium port corresponding to the FIFO buffer. It is also not clear whether "the first-in-first-out buffer" refers to the FIFO buffer included in the first communications-medium port, the FIFO buffer included in the second communications-medium port, any FIFO buffer included in the first and second

communications-medium ports, or a FIFO buffer included in a corresponding communications-medium port.

Claim 12 recites "the first-in-first-out buffer within each of the two communications-medium ports" in line 2. The limitation in claim 12 and the limitation in claim 10, together, appear to suggest that the first communications-medium port includes a first FIFO buffer and the second communications-medium port includes a second FIFO buffer. If this is the case, "each of the first-in-first-out buffers" is more appropriate.

Claim 14 recites "the first entity one" in line 5 and "the second entity one" in line 9. There are insufficient antecedent bases for the above limitations in the claim.

Furthermore, claim 14 recites "the first entity one of a remote device external to the storage shelf, and a storage shelf router integrated circuit having a unique number less than the assigned unique number, and the second entity one of a remote device external to the storage shelf, and a storage shelf router integrated circuit having a unique number greater than the assigned unique number" in lines 5-12. The examiner is not clear as to what the limitation represents. Applicant is required to provide an explanation of the limitation and the support for such limitation by specific page, line numbers, labels and drawings (as appropriate), in order to help the examiner understand the scope of the claim.

3. The rejections that follow are based on the examiner's best interpretation of the claims.

Claim Rejections - 35 USC § 102/103

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claim 9 is rejected under 35 U.S.C. 102(b) as being anticipated or, in the alternative, under 35 U.S.C. 103(a) as obvious over by Fukuzawa et al. (US 6,098,129).

Fukuzawa teaches a storage-shelf-router integrated circuit [104, FIGs. 1-3] employed within a storage shelf [10, 105 - FIG. 1] that contains a number of data-

storage devices [105, FIGs. 1-2] interconnected to two communications media [two of 103, 108(117), 108(126) - FIG. 2], the storage-shelf-router integrated circuit including:

a first communications-medium port [one of 103, 108(126), 108(177) - FIG. 2];

a second communications-medium port [another one of 103, 108(126), 108(177) - FIG. 2];

one or more processors [302, FIG. 3];

a number of data-storage-device-link-port components that transmit data and commands to the number of data-storage devices through disk-drive links [FIG. 6];

routing logic [314, 315 - FIG. 3] for routing commands received through the first and second communications-medium ports to the one or more processors and for routing data received through the two communications-medium ports to the number of data-storage-device-link-port components [col. 7, line 26-col. 8, line 16].

The examiner refers applicant to the teachings of Hill [US 6,054,828; col. 9, lines 26-31; 32; 37] and Variot et al. [US 6,088,914; col. 3, lines 31-36] for intrinsic evidence of integrated circuit being interpreted as a circuit of integrated components - with the integrated components including one or more chip(s) [i.e. an integrated circuit is not necessarily a chip].

The examiner also refers applicant to the teachings of Singhal et al. [US 6,658,478; col. 5, lines 18-20] for intrinsic evidence of disk drives being mounted in a rack-mountable storage shelf having one or more hot-pluggable disk drive sleds; the teachings of Tusler et al. [US 5,995,377; FIG. 1; col. 1, lines 11-32] for intrinsic evidence of an array of disk drives being implemented as a modular storage shelf; the teachings

of Reger et al. [US 7,127,798; col. 2, lines 2-5] for intrinsic evidence of disk drives enclosures being called shelves. Since an array of disk drives is referred as a storage shelf, and since Fukuzawa teaches a routing function for a disk drive group - which is essentially an array of disk drives, Fukuzawa teaches a router for a storage shelf - hence a storage-shelf-router.

Alternatively, it would have been obvious to one of ordinary skill in the art at the time the invention was made for the plurality of disk drives in a disk drive group to reside within a storage shelf enclosure in order to facilitate insertion and removal, and in order to allow swapping of individual disk drives during the operation - as is suggested by Tusler [col. 1, lines 11-32], for example.

Note that the limitations from the specification are not read into the claims, although the claims are interpreted in light of the specification. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993)

8. Claims 10-12, 14, 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuzawa et al..

9. As per claim 10, Fukuzawa does not teach each of the two communications-medium ports including a FIFO for writing commands and data and for accessing commands and data from the FIFO. Since it was known in the art at the time the invention was made for a communications port to include a FIFO to regulate commands and data to and from the communications port, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a FIFO in each

of the communications ports in order to regulate commands and data to and from the communications ports.

10. As per claim 11, Fukuzawa does not teach accessing an initial portion of a command or data from the FIFO of a communications-medium port while the communications-medium port is writing a later portion of the command or data into the FIFO. Since it was known in the art at the time the invention was made to use dual-port memory to allow for simultaneous access and write, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the FIFO with a dual-port memory in order to allow for simultaneous access from and write to the FIFO.

11. As per claim 12, Fukuzawa teaches the processor [307, FIG. 3] for directing the commands to the appropriate destinations, hence routing commands accessed from the FIFO to the processor to a module that writes the command to a shared memory [303, 305, 306 - FIG. 3] from which the commands can be accessed by the processor.

12. As per claim 14, Fukuzawa teaches the storage-shelf-router being assigned a unique number [DISK CONTROLLER A, FIG. 2] and is linked through the first communications-medium port and a first communications medium to a first remote device external to the storage shelf [DISK CONTROLLER B/DISK DRIVE GROUP B, FIG. 2], and is linked through the second communications-medium port and a second communications medium to a second remote device external to the storage shelf [DISK CONTROLLER X/DISK DRIVE GROUP X, FIG. 2] - where the DISK CONTROLLER B has a unique number different than the assigned unique number, and the DISK

CONTROLLER X has yet another unique number that is different from the both assigned unique number and the unique number of DISK CONTROLLER B, and constituting an obvious variant of an embodiment with the unique number of DISK CONTROLLER B having a unique number less than the assigned unique number, and the unique number of DISK CONTROLLER X having a unique number greater than the assigned unique number.

13. As per claim 28, Fukuzawa teaches a communications medium being a fibre channel medium [126, FIG. 2] and a SCSI medium [117, FIG. 2] and further fibre channel based on SCSI being used [col. 6, lines 38-39] - hence the communications media being fibre channel communications media. Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for all communications media to be fibre channel communications media in applications that require extended distances since it was known to use fibre channel for extended distances applications [col. 6, lines 34-37].

Fukuzawa does not teach the data storage devices being ATA disk drives. Since it was known in the art to use ATA disk drives as opposed to SCSI disk drives because ATA disk drives are less expensive, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use ATA disk drives in applications where cost is a factor, in order to reduce cost.

14. As per claim 29, Fukuzawa teaches the communications media being fibre channel communications media and ATA disk drives (see rejections of claim 28 above), but does not teach SATA disk drives. Since SATA is a new technology that offers better

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speed, cable management, hot swap ability, and compatibility with SAS to SATA disk drives, and since it is expected for SATA disk drives to eventually completely replace ATA disk drives, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use SATA disk drives in order to make use of the aforementioned advantages.

Double Patenting

15. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

16. Claim 9 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 11/010,842. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of the copending application claims all the

limitations recited in claim 9 of the current application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Allowable Subject Matter

17. Claims 1-8 are allowed. Claims 13, 15-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and if the 112 rejections are overcome.

Response to Arguments

18. Applicant's arguments with respect to the pending claims, claims 1-29, have been considered but are moot in view of the new ground(s) of rejection and/or not persuasive.

19. With respect to the restriction requirement, applicant's argument is moot in view of claims 1-29 being pending in the current application and in view of claims 30-43 being cancelled from the current application.

20. With respect the claim objection of claim 14, applicant's argument is not persuasive because the argument is ambiguous (specifically, it is not clear how "the first entity one of..." is a clause that modifies the independent clause), and because the scope of the claim is ambiguous - see 112 rejection of claim 14 above.

21. With respect to the 112 rejections of claim 10, applicant's argument that the

antecedent for "the communications-medium port" being "each of the two communications-medium port" is moot because such antecedent renders the claim indefinite - see 112 rejection of claims 10-12 above.

22. With respect to the 102 and 103 rejections, applicant essentially argues that the I/O subsystem of Fukuzawa is not a storage shelf, and that a printed circuit board is not an integrated circuit. The argument is not persuasive because it has been shown that an integrated circuit can be considered as a circuit of integrated components - hence a printed circuit board or other types of circuit, and because a plurality of disk drives of an I/O subsystem can be considered as a storage shelf - see rejection of claim 9 above.

Applicant also argues Fukuzawa does not teach a single-integrated-circuit storage-shelf-router. In addition, applicant argues that the storage-shelf-router provides an abstraction to a disk-array controller, allowing the disk array controller to access a large number of individual disk drives through a single FC-port address. The examiner notes that the features upon which applicant relies (i.e., a single-integrated-circuit storage-shelf router, and the storage-shelf-router providing an abstraction to a disk-array controller, allowing the disk array controller to access a large number of individual disk drives through a single FC-port address) are not recited in the rejected claim(s).

Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In order for a claim to be allowable, the claim needs to be recited with sufficient differentiation between the invention and the prior art - without any limitation of the

specification being read into the claim.

Conclusion

23. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tanh Q. Nguyen whose telephone number is 571-272-4154. The examiner can normally be reached on M-F 9:30AM-7:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Huynh can be reached on 571-272-4147. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

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Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TANH Q NGUYEN
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TECHNOLOGY CENTER 2100

Tanh Q. Nguyen
June 28, 2007

TQN
June 28, 2007